

# SHUQI DAI

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## EDUCATION

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- **Carnegie Mellon University, Pittsburgh, PA, USA** Aug. 2018 – Present
  - Ph.D. candidate in Computer Science Department
  - Advisor: Prof. Roger B. Dannenberg.
  - Research Area: Computer Music, Music Artificial Intelligence
  - Teaching Assistant: 15-323/623 Computer Music Systems and Information Processing (2019 Spring)  
15-322/622 Introduction to Computer Music (2019 Fall)
  - Selected Music Courses: Harmony I - II, Counterpoint Theory & Applications, Form Analysis, Eurhythmics I - III, Solfege I - III, Repertoire and Listening for Musicians, Orchestration, Conducting, Symphonies of Mahler, Shaping Time in Performance, Sound Recording, Sound Editing & Mastering, 1-1 Composition Studios
- **Peking University, Beijing, China** Jul. 2018
  - B.S. in Computer Science and Technology

## RESEARCH INTERESTS

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- Computer Music, Artificial Music Intelligence, Music Information Retrieval
- Selected Research Projects:
  - **Expressive singing voice synthesis** with stylistic singing techniques using diffusion models (with NVIDIA)
  - From score to performance: **expressive performance generation** for woodwind, brass, and string instruments
  - **Stylistic deep music generation** using structure, control, and imitation techniques (some with Adobe)
  - **Repetition and structure analysis** in music via data-driven approaches
  - Study of expectation and surprise in **music perception with EEG analysis**
  - Human-Computer interaction: **Human-Computer Music Performance** system

## SELECTED PUBLICATIONS

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- **S. Dai**, Y. Wu, S. Chen, R. Huang and R. B. Dannenberg, “SingStyle111: A Multilingual Singing Dataset With Style Transfer”, in *Proceedings of the 24th International Society for Music Information Retrieval Conference, Milan, Italy, 2023*.
- **S. Dai**, H. Yu and R. B. Dannenberg, “What is missing in deep music generation? A study of repetition and structure in popular music”, in *Proceedings of the 23rd International Society for Music Information Retrieval Conference, Bengaluru, 2022*.
- **S. Dai**, Z. Jin, C. Gomes and R. B. Dannenberg, “Controllable deep melody generation via hierarchical music structure representation”, in *Proceedings of the 22nd International Society for Music Information Retrieval Conference, Online, 2021*.
- **S. Dai**, X. Ma, Y. Wang, R. B. Dannenberg, “Personalized Popular Music Generation Using Imitation and Structure”, *arXiv preprint arXiv:2105.04709*, 2021.
- **S. Dai**, H. Zhang, R. B. Dannenberg, “Automatic Analysis and Influence of Hierarchical Structure on Melody, Rhythm and Harmony in Popular Music”, in *Proceedings of the 2020 Joint Conference on AI Music Creativity (CSMC-MuMe)*, 2020.
- Z. Wang, K. Chen, J. Jiang, Y. Zhang, M. Xu, **S. Dai**, X. Gu, G. Xia, “Pop909: A Pop-song Dataset for Music Arrangement Generation”, in *Proceedings of the 21st International Society for Music Information Retrieval Conference (ISMIR)*, Montal, Canada, 2020.

- **S. Dai**, G. Xia, Z. Zhang, “Music Style Transfer: A Position Paper”, in *Proceedings of 6th International Workshop on Music Metacreation (MUME)*, Salamanca, Spain, June 2018.
- **S. Dai**, G. Xia, “Computational Models For Common Pipa Techniques”, **Best Student Paper Award** in *Proceedings of the 5th National Conference on Sound and Music Technology*, China, October 2017.

## RESEARCH EXPERIENCE

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- **Carnegie Mellon University**, Computer Science Department Aug. 2018 – present  
*Graduate Student Researcher*, Advisor: Roger B. Dannenberg  
 - Expressive performance generation from score for woodwind, brass, and string instruments.  
 - Stylistic music generation using deep learning / statistical machine learning / reinforcement learning.  
 - Music understanding: hierarchical music structure analysis, repetitive musical pattern analysis.  
 - Study of expectation and surprise in music perception with EEG analysis, co-advised by Prof. Tai-Sing Lee.  
 - Human-Computer interaction: design and develop Human Computer Music Performance system.
- **NVIDIA Research**, Deep Imagination Team Summer 2022 - present  
*Research Intern*, Advisor: Siddharth Gururani, Mingyu Liu.  
 Expressive singing voice synthesis with stylistic singing techniques using diffusion models.
- **Adobe Research**, Audio Research Team & RED Team Summer 2020 and 2021  
*Research Intern*, Advisor: Zeyu Jin, Celso Gomes, Tim Ganter  
 Deep music generation via hierarchical music structure representation (music frameworks) for content creation.
- **Carnegie Mellon University**, Computer Science Department Sep. 2019 – Dec. 2019  
*Graduate Student Researcher*, Advisor: Christos Faloutsos  
 Hierarchical logical clustering for State-Action pair sequences in markov decision process.
- **National University of Singapore**, Sound and Music Computing Lab Feb. 2018 – Jul. 2018  
*Research Intern*, Advisor: Ye Wang, Roger B. Dannenberg  
 Personalized music generation for Rhythmic Auditory Stimulation therapy for Parkinson Disease.
- **New York University Shanghai**, Computer Music Lab Aug. 2017 – Dec. 2017  
*Research Intern*, Advisor: Gus Guangyu Xia  
 Digitalization of pipa (traditional Chinese instrument) performance techniques.
- **Microsoft Research Asia**, Knowledge Computing Group Mar. 2017 – Aug. 2017  
*Research Intern*, Advisor: Chin-Yew Lin  
 Entity linking and domain entity alignment in Natural Language Processing.
- **Peking University**, Mobile Computing Group Mar. 2015 – Mar. 2016  
*Research Assistant*, Advisor: Kaigui Bian  
 Mobile recommendation application that uses mobile gestures.

## INDUSTRY EXPERIENCE

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- **Hulu Inc**, Device Team, Beijing Mar. 2016 – Jun. 2016  
*Software Development Intern*, Mentor: Yanzhang Li  
 Interleaved dash player with all Android devices.

- **Google Inc**, Rendering Team, Beijing  
*Engineering Intern*, Mentors: Xiaobo Zhou & Zhi Qu  
 Evaluation of rendering embedded content in web pages.

Jun. 2015 - Aug. 2015

## PROGRAMMING AND MUSIC SKILLS

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- Programming**
  - Languages: C/C++, Python, JavaScript, Java, Matlab, R, mySQL, HTML5/CSS
  - Frameworks: PyTorch, Tensorflow, Keras
  - Music Programming Languages: Serpent, SuperCollider, Nyquist, Max, Pure Data
- Music**
  - Professional pipa player, started playing at age 6, tutored by top pipa musician Prof. Yabo Pan
  - 6 years of formal training in Western opera singing and Chinese folk singing
  - Music composer and producer

## SELECTED HONORS & AWARDS

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- Best Student Paper Award, 5th National Conference on Sound and Music Technology, China 2017
- Women in Music Information Retrieval (MIR) Award, 18th International Society for MIR Conference 2017
- Yang Fuqing and Wang Yangyuan Academic Scholarship, Peking University (5 out of 300) 2016
- Excellent Student Award, Peking University (top 8%, top 10%, for all-round achievements) 2014, 2016
- Excellence Award, *To Silicon Valley* China Start-up Competition (team leader, 9<sup>th</sup> out of 313) 2016
- 2<sup>nd</sup> Place in Peking University National Hackathon (out of 42) 2016
- Fung Scholarship, Victor & William Fung Foundation (top 15%) 2015
- Tung OOCL Scholarship, The Tung Foundation & Peking University (8 out of 348) 2014
- 3<sup>rd</sup> Prize in ACM/ICPC on-campus contest, Peking University 2014, 2015, 2016
- 1<sup>st</sup> Place in National Olympiad in Informatics, Anhui Province (out of 5,634) 2012
- 2<sup>nd</sup> Prize in Chinese Mathematics Olympiad in Province 2012

## ACTIVITIES

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- Speaker at Workshop: GET (Girls Entering Tech) Success May 2020
- Vocal Director and Leading Singer of Musical *Dirty Rotten Scoundrels* in CMU Jan. 2019 - May 2019
- Performed Pipa solo in several concerts in National University of Singapore Feb. 2018 - Jul. 2018
- Pipa Player in PKU Chinese Orchestra Club Sep. 2013 – Dec. 2017
- Mezzo-soprano in PKU Hall Chorus Mar. 2017 – Dec. 2017
- Leading Singer in performance of *Les Misérables* by PKU Musical Club Jan. 2016 – Jun. 2016
- Director of UNICEF in PKU International Model United Nations Sep. 2013 – May 2015
- Education and Science Journalist for *Youth of Peking University* Magazine Sep. 2013 – Nov. 2014